

# mm-Wave Near Field Periodic Couplers For Future Module Interconnects (NFPC)

Completed Technology Project (2014 - 2017)



## Project Introduction

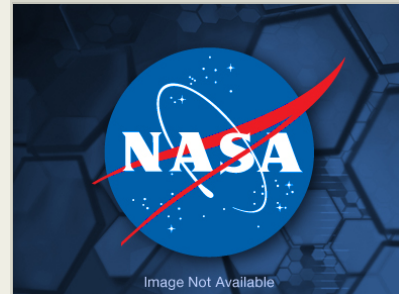
A high speed dielectric waveguide datalink providing fault tolerance, eliminating reliance on electrical contact and increasing data-rates to the Gb/s range.

Millimeter-wave (mm-wave) communications have gained attention in recent years, primarily since the high fractional bandwidth potentially offers multi-Gb/s wireless data-links [1-3]. Recently demonstrated mm-wave transceivers offer impressively high data-rates, however, their range is typically limited to only a few meters, and so non-free space mm-wave communication approaches have been developed to operate over longer distances of up to 10 meters. Dielectric ribbons are one example of this, and allow direct coupling from a transceiver with either an on-chip probe or antenna structure placed nearby the ribbon's end. The simplicity of coupling makes them attractive for aircraft and spacecraft applications as transmission through a dielectric ribbon does not rely on an electrical contact, only a coupled wave. Additionally dielectric ribbons can be much lighter weight than copper interconnects, reducing overall payload weight. Also demonstrated data rates of 3 Gb/s can easily be multiplexed down to several Mb per second allowing replacement of several hundred low speed control cables.

## Anticipated Benefits

Can improve electrical reliability, replace heavy cabling and combine many 100s of low speed cables into a single interconnect. Also improved data rate over existing interconnect technology

Data transfer speed, reliability and efficiency can be improved a any electronic hardware the requires weight and power savings.



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## Organizational Responsibility

### Responsible Mission Directorate:

Mission Support Directorate (MSD)

### Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

### Responsible Program:

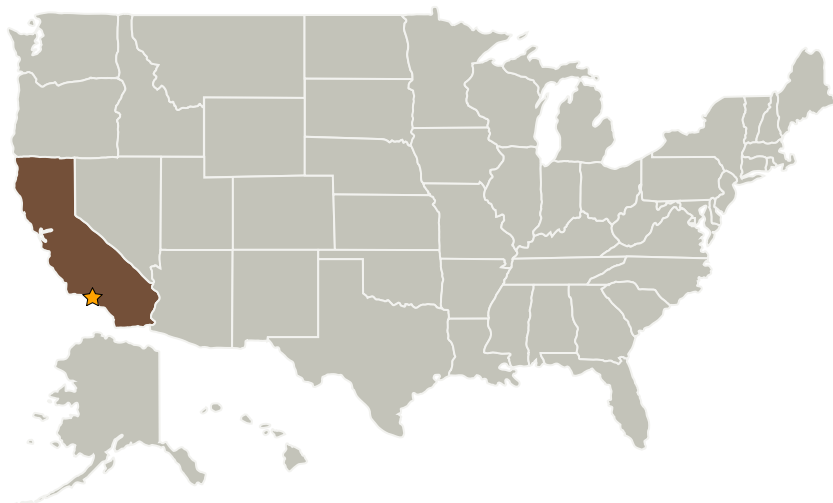
Center Independent Research & Development: JPL IRAD

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## Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory (JPL)	Lead Organization	NASA Center	Pasadena, California

## Primary U.S. Work Locations

California

## Project Management

**Program Manager:**

Fred Y Hadaegh

**Project Manager:**

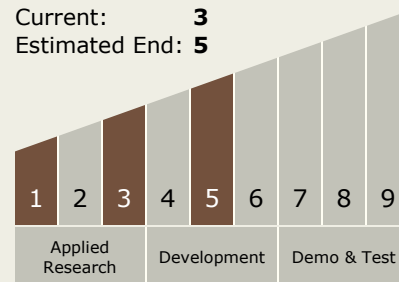
Jonas Zmuidzinis

**Principal Investigator:**

Adrian J Tang

## Technology Maturity (TRL)

Start: 1  
 Current: 3  
 Estimated End: 5



## Technology Areas

**Primary:**

- TX02 Flight Computing and Avionics
  - └ TX02.1 Avionics Component Technologies
    - └ TX02.1.3 High Performance Processors